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ENGINEERING AND DESIGN

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# **ESTABLISHING AND MAINTAINING INSTITUTIONAL CONTROLS FOR ORDNANCE AND EXPLOSIVES (OE) PROJECTS**

**ENGINEER PAMPHLET**

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15 December 2000

Engineering and Design  
ESTABLISHING AND MAINTAINING INSTITUTIONAL CONTROLS FOR  
ORDNANCE AND EXPLOSIVES (OE) PROJECTS

1. Purpose. This pamphlet provides U.S. Army Corps of Engineers (USACE) personnel and their contractors with general guidance on the process to be used to develop, implement, and maintain institutional controls on Ordnance and Explosives (OE) project sites.
2. Applicability. This pamphlet applies to all Headquarters, USACE (HQUSACE) elements and all USACE commands having responsibility for performing OE response activities.
3. Distribution Statement. Approved for public release; distribution is unlimited.
4. References. Required and related references are at Appendix A.
5. Explanation of Abbreviations and Terms. Abbreviations/acronyms and special terms used in this pamphlet are explained in the glossary.

FOR THE COMMANDER:

10 Appendices  
(See Table of Contents)

  
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Chief of Staff

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## CHAPTER 1 GENERAL

### 1-1. Introduction.

a. The OE response process is designed to enhance public safety and protect the human environment from OE remaining from past DOD operations. The typical strategies for addressing the presence of OE on a site are physical removals and institutional controls. Although physical removals are conducted to reduce the amount of OE at a site, current technologies are not adequate to provide for the detection and removal of all ordnance. Therefore, institutional controls are implemented to manage residual risk remaining at an OE site. Institutional controls are also sometimes put into place without a physical removal, as a stand-alone response.

b. Risk from OE can be managed if the public is informed about the hazards, is willing to take reasonable precautions, and is willing to alter their behaviors. This document will focus on how institutional controls may be used to successfully manage OE risk. This document will emphasize the importance of encouraging meaningful stakeholder participation, supporting community needs and fostering long-term community commitment during the development, implementation and maintenance of institutional controls.

1-2. Policy. The policy of the USACE is to establish and maintain institutional controls in a manner which fully meet customers' expectations of quality, timeliness, and cost effectiveness within the bounds of legal responsibility. An acceptable level of quality does not imply perfection; however, there should be no compromise of functional, health, or safety requirements. Adherence to the Quality Management principles outlined in Engineer Regulation (ER) 5-1-11, Program and Project Management and ER 1110-1-12, Quality Management, will contribute to achieving this goal. OE response procedures must be formulated to ensure harmony with the USACE Strategic Vision and should be executed in concert with activities presented in other USACE guidance.

### 1-3. Regulatory Authorities.

a. Major Subordinate Commands (MSC), district commands, OE Design Centers, and the OE Mandatory Center of Expertise (MCX) will comply with all applicable laws and regulations. The district, which serves as the Project Manager (PM), will provide general legal services. For Formerly Used Defense Sites (FUDS) projects, the determination of the laws and regulations governing environmental aspects for any specific OE project will be made in consultation with the OC supporting the OE MCX. In the event of any sort of dispute with a regulator over the governing laws on a FUDS project, the district providing general legal services will represent the agency in negotiations or adversary

proceedings. For non-FUDS projects performed by the USACE under a different program or authority (i.e., Base Realignment and Closure [BRAC], Installation Restoration [IR], Work for Others), the appropriate legal representative of the sponsoring agency will be the lead counsel for all legal matters, although USACE counsel will be available for consultation.

b. OE response actions will be executed in compliance with the OE requirements of Department of Defense (DOD) 6055.9-STD; Army Regulation (AR) 385-61; AR 385-64; Department of the Army Pamphlet (DA Pam) 385-61; Headquarters, Department of the Army (HQDA) LTR 385-98-1 "Explosives Safety Policy for Real Property Containing Conventional Ordnance and Explosives"; ER 1110-1-8153 "Ordnance and Explosives Response"; "Safety and Health Requirements for Ordnance and Explosives Response Actions" to be published in ER 385-1-95; and any other applicable OE publications listed at Appendix A. All USACE elements will comply with DOD and DA safety and health regulations and procedures.

c. The regulatory authorities governing the establishment and maintenance of institutional controls during OE response actions include: Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); National Oil and Hazardous Substance Contingency Plan (NCP); Defense Environmental Restoration Program (DERP); BRAC; Resource Conservation and Recovery Act (RCRA); and 40 CFR Part 260 et al - Military Munitions Rule. These regulatory authorities are discussed in detail in Engineer Pamphlet (EP) 1110-1-18, Ordnance and Explosives Response. Since the BRAC process has dealt with issues of transferring or leasing land that may contain residual OE contamination, Appendix B provides a general overview of the BRAC process. It is necessary to have a basic understanding of this process in order to understand the scope of institutional controls that may be used at transferring or transferred military properties.

1-4. Responsibilities. It is the responsibility of all USACE personnel involved with the OE Program to safely execute OE response projects and to comply with applicable laws, regulations, and policies. A detailed discussion of USACE organizational responsibilities for OE response projects is presented in Engineer Regulation (ER) 1110-1-8153, Ordnance and Explosives Response.

1-5. Functional Roles. The following section provides a description of the functional roles for USACE elements regarding the establishment and maintenance of institutional controls during OE response projects. A more comprehensive description of the functional roles for the organizations during OE response projects discussed below is provided in ER 1110-1-8153.

a. Headquarters, US Army Corps of Engineers. HQUSACE is responsible for monitoring the Engineering Evaluation and Cost Analysis (EE/CA) report, a component of which is the Institutional Control Plan. In the Institutional Control Plan, the establishment and maintenance of institutional controls for a specific site are discussed.



b. Major Subordinate Commands. In addition to the requirements stated in ER 1110-1-8153, MSCs will perform the below listed functions pertaining to the establishment of institutional controls. These responsibilities may be delegated to assigned districts within a MSC's geographic area.

- (1) Establish contact with zoning and permitting authorities;
- (2) Coordinate with local authorities; and
- (3) Coordinate maintenance inspections, including recurring reviews.

c. District. A district will perform those activities for institutional controls that are delegated to it by the MSC.

d. OE Design Center. The OE Design Center will provide direct support to the MSCs and districts, as requested, for establishing and maintaining institutional controls.

e. OE MCX. The OE MCX will:

(1) Review and provide comments and written concurrence or non-concurrence on products related to institutional controls (e.g., Statement of Work, Work Plan, and Institutional Analysis, Institutional Controls Plan) to ensure compliance with Federal, DOD, DA and USACE OE safety and OE environmental regulations.

(2) Provide technical support to any USACE office conducting institutional controls activities in areas where unexploded ordnance (UXO) is suspected or known to exist.

f. State, Local, and/or Tribal Governments/Authorities. State, local, and/or tribal governments/authorities are critical to the development and selection of site-specific institutional controls in concert with USACE.

g. Regulators. Regulators provide advice and assistance to the USACE and state, local, and/or tribal governments in the development of a viable institutional control program for a particular site. Once an institutional control alternative has been selected for a site, regulators will provide oversight to ensure continued compliance with the institutional control.

h. Landowners. Landowners provide critical input into the development of a viable institutional control program for their property. If an institutional control program is selected for their property, the property owner will maintain compliance with the provisions of the institutional control and notify the USACE and the appropriate, state, local, and/or tribal government with any proposed land use changes for the site that may impact the effectiveness of the institutional control.

## CHAPTER 2 OVERVIEW OF INSTITUTIONAL CONTROLS

2-1. Introduction. Institutional controls are mechanisms which protect property owners and the public from hazards contained on a site by limiting the access or use of a property, or by warning of the hazard. Institutional controls are substantially the same as “land use controls,” as defined in the Department of Defense’s Interim Policy on Land Use Controls Associated with Environmental Restoration Activities (31 August 2000). This chapter discusses the three general types of institutional controls: legal mechanisms, engineering controls, and educational programs. Specific examples of these types of institutional controls are presented in Appendix C. This chapter also discusses some of the strengths and limitations of these institutional controls, as well as their applications.

### 2-2. Legal Mechanisms.

a. This section provides an overview of the effectiveness of legal mechanisms. Specific legal approaches including easements, restrictive covenants, reversionary interests, zoning, permitting, siting restrictions, and overlay zoning have been used for many purposes other than limiting exposure to environmental risks such as OE, and are described in detail in Appendix C.

b. Legal mechanisms are particularly effective types of institutional controls because:

(1) Other than periodic monitoring necessary for enforcement, legal mechanisms do not require the physical maintenance that is necessary for other types of institutional controls, such as engineering controls.

(2) Title recording systems, local planning commissions, and other administrative systems and associated staff already exist in most jurisdictions and can be used to implement a legal mechanism as part of an institutional control program. Additional funding may be required for the administering agency depending on the extent of additional effort required due to the implementation of an institutional control program at a site within their jurisdiction.

c. Legal mechanisms require constant oversight and support in order to remain effective. Administrative programs to implement and enforce legal mechanisms are already in place; however, they are sometimes not effective in protecting against inappropriate land use and should be used in conjunction with other programs.

### 2-3. Engineering Controls.

a. This document also considers engineering controls. Engineering controls either limit the public's access to a site or limit the public's exposure to the residual contamination that remains on a site to an acceptable level. Engineering controls can take on many forms and are often developed to meet the specific conditions of a site. Engineering controls are most effective when implemented in concert with other institutional controls, rather than as stand-alone mechanisms.

b. When using engineering controls to limit the public's exposure to contaminants, the current land use of the area around the contaminated site must be considered. For example, if the property is surrounded by residential areas, schools, or playgrounds, or if the property is frequented by the public, the potential for exposure and adverse consequences is increased and therefore a higher level of access control would be necessary. Examples of engineering controls that have historically been effective in limiting access are fences, signs, and soil caps. Appendix C provides information on the strengths and limitations of these types of engineering controls.

c. Engineering controls protect against inadvertent access or exposure to the hazards associated with a site. They have the advantage of being passive, i.e., once they are in place they do not require human interaction to provide notice or protection (other than to maintain the integrity of the control). Another advantage of engineering controls is that they provide a direct deterrent to those who are the most likely to come into contact with a contaminated area by either limiting access or providing a warning as to the nature of the dangers posed by a contaminated site. Engineering controls are an important part of institutional control programs in areas where it is particularly important to protect against inadvertent access, such as in areas where it can be expected that children will be in the vicinity. Engineering controls require routine inspection and maintenance in order to remain effective.

### 2-4. Educational Controls.

a. The use of educational controls is usually a good strategy to manage and reduce residual risk from public exposure to OE. An education program may take on many forms and may be easily tailored to meet the specific needs of a site and the surrounding community. Examples of education programs include formal education seminars and public notices.

b. Educating the local community is an extremely important part of any institutional control program. Generally, if people are aware of and understand the hazards associated with an OE-contaminated site, they will take the necessary precautions to avoid exposure. Education programs can be tailored to meet the specific needs of a particular audience (e.g., local homeowners, school children, regulators, developers, etc.) and can be performed as often as necessary to educate those that are at greatest risk for exposure to OE. Educational efforts constitute a stand-alone institutional control, but

can also improve the effectiveness of other controls that are part of the overall program. Appendix C provides additional information on the strengths and limitations of education controls.

### CHAPTER 3

#### ESTABLISHING AN INSTITUTIONAL CONTROL PROGRAM

3-1. Introduction. The establishment of an institutional control program is an important component of a comprehensive risk management strategy for an OE contaminated property. This chapter will discuss how institutional controls fit into the risk management approach and thereby, provide a level of protection for the local community from OE hazards. This chapter will also discuss how local stakeholder involvement is crucial to the establishment of a successful institutional control program.

3-2. Risk Management. Risk management is used by the government when OE risk remains at a site. The risk management approach is designed to encourage meaningful stakeholder participation, foster long-term community commitment to the institutional control program, and provide government support for community needs. Risk Management consists of:

a. Risk Minimization Consistent with Community Needs. This component of risk management focuses on minimizing the physical OE threat by removing as much of the ordnance as is practical considering the needs of the community. This process occurs during the EE/CA and removal action phases of the OE response process. Consideration should also be given to the possibility of engineering controls, such as caps or other barrier-like structures to directly minimize the existing hazards. Frequently, maintenance is required to ensure effectiveness of any risk minimization strategy that is selected.

b. Residual Risk Management. Managing the residual risk by encouraging local initiatives is the essence of institutional control planning. The local community is encouraged to become actively involved in developing local initiatives to implement institutional controls. Local initiatives are institutional controls for which the local authorities agree to support and provide long-term enforcement. The federal government does not have the authority to enforce local initiatives; however, it can encourage the local community and pledge its support to provide leadership, expertise, resources and a continuing long-term review of the implemented institutional control program.

c. Recurring Review. Monitoring the effectiveness of all elements of the implemented project is the basic nature of recurring review. At a minimum all projects must be reviewed every five years. The frequency of review must be a design element that is site-specific. The recurring review elements are a clear indication that the federal government provides a long-term commitment to managing residual risk at sites contaminated by OE. Recurring review provides the opportunity to respond to problems that develop over time, renew the communities understanding of the ordnance problem, refresh commitments necessary to effectively protect the communities from ordnance hazards, re-evaluate the effectiveness of the institutional control program, and to ensure productive use of the land resources.

3-3. Developing Site-Specific Objectives. To effectively manage long-term residual risk at an OE site, the government needs to encourage meaningful stakeholder involvement. Coordination with local officials and other stakeholders is essential to identifying site-specific objectives for the institutional control program. This coordination involves listening to community officials about their form of government, discovering what local programs exist, and uncovering the community's needs for addressing the ordnance problem. This section discusses the steps required to establish site-specific objectives. Table 3.1 summarizes these steps.

Table 3.1 Steps Required to Establish Site-Specific Objectives
<ul style="list-style-type: none"><li>• Determine the problems requiring change.<ul style="list-style-type: none"><li>- Site history</li><li>- Types of activities</li><li>- Types and quantities of munitions</li><li>- Current and future land use</li></ul></li><li>• Identify types of reuse allowed.</li><li>• Determine the type of activities to be restricted.</li><li>• Determine site-specific restrictions.</li></ul>

3-4. Determine the Problems Requiring Change. The first step in establishing site-specific objectives is to identify the specific problems associated with OE at the site. To do this, both the historical use of the site and current/future land uses should be evaluated.

a. The history of the site should be reviewed to evaluate the type(s) of activities that occurred at the site, as well as the type(s) and quantity(ies) of munitions used.

(1) Type of activities. Activities that may result in the presence of OE include: ammunition plants; storage, test, impact, and training areas; and bombing or target ranges. These different uses will result in differing distributions of OE, both horizontally and vertically.

(2) Type and quantity of munitions. The type and quantity of munitions used at a site may have varied over the life of the site, depending on changing missions and technology. One site may therefore include numerous types of munitions. OE may include bombs, artillery, mortar, aircraft cannon or tank-fired projectiles, dispensed munitions, submunitions, rockets, guided missiles, grenades, general demolition materials, bulk explosives, pyrotechnics, torpedoes, mines, small arms ammunition, and chemical/biological munitions. In addition to the differing types of munitions, it must also be determined

whether chemical agents were used at a site. In the case of chemical rounds, the propellants, explosives and pyrotechnics (PEP) as well as the chemical agent fillers included in munitions may pose a hazard. Just as with the types of activities, the horizontal and vertical distribution of OE will vary for differing types of munitions.

b. **Current and Future Land Use.** The current land use and reasonably anticipated future land use of the property and surrounding area should be considered when developing the specific objectives for a site. This information will aid in identifying the particular risks of exposure to OE at the site. For example, the risk to be controlled will vary depending on whether the site is currently developed or undeveloped and whether it is located in a sparsely populated or densely populated area. Consultation with local government agencies and the local citizenry will help reveal reasonably anticipated future use. The following information and resources may be helpful in evaluating the current and future land use:

- (1) Zoning laws;
- (2) Zoning maps;
- (3) Comprehensive community master plans;
- (4) Population growth patterns and projections (e.g., Bureau of Census projections);
- (5) Accessibility of site to existing infrastructure (e.g., transportation and public utilities);
- (6) Institutional controls currently in place;
- (7) Site location in relation to urban, residential, commercial, industrial, agricultural and recreational areas;
- (8) Federal/state land use designation (e.g., national parks, state recreational areas, governmental facilities providing extensive site access restrictions, such as DOD facilities);
- (9) Historical or recent development patterns;
- (10) Cultural factors (e.g., historical sites, Native American religious sites);
- (11) Natural resources information;
- (12) Environmental justice issues;
- (13) Location of on-site or nearby wetlands;

- (14) Proximity of site to a floodplain;
- (15) Proximity of site to critical habitats of endangered or threatened species; and
- (16) Geographic and geologic information.

3-5. Identify the Type(s) of Reuse Planned. The types of reuse planned at a site may be stated in broad categories such as residential, commercial, industrial, recreational, agricultural, etc. Depending on site-specific characteristics, it may be more effective to be more specific than these broad categories. The historical use of the site and the clearance depth used for any previous cleanup activities should be considered when identifying the types of reuse planned.

3-6. Determine the Type(s) of Activities to be Restricted. In addition to addressing the types of appropriate reuse of an OE-contaminated site, it may be necessary to also address specific activities that are not planned. This may include prohibitions or restrictions on excavation, drilling, or disturbance of soil. A restriction on excavation or drilling, for example, may require an OE clearance prior to any field activities.

3-7. Determine Site-Specific Requirements. Site-specific restrictions may be developed based on the nature and extent of the OE contamination, the current and proposed future land use, and the nature of activities performed in the area. Site-specific restrictions may also be developed based on special characteristics of the surrounding area. For example, several other programs exist that use institutional controls to address site-specific characteristics requiring special restrictions. Appendix D includes a description of several programs that, in addition to being examples of institutional control programs, may also provide additional avenues to restrict future use at OE-contaminated sites. For example, development of an OE site that encompasses wetland areas may be restricted by wetlands regulations as well as by an institutional control program designed specifically to address the OE contamination.

3-8. Checklist for Establishing Site-Specific Objectives. Appendix E contains a checklist addressing issues related to establishing site-specific objectives in an institutional control program. The district's real estate division is another resource for additional examples of site-specific objectives that may be applicable to a site.



## CHAPTER 4 DEVELOPMENT OF AN INSTITUTIONAL CONTROL PROGRAM

4-1. Introduction. Once site-specific objectives have been identified, the government and local community may use a variety of tools to aid in the development of an institutional control program. The first tool, institutional analysis, should be conducted at any site where an institutional control program is being considered. The other tools, a land use matrix and a land use classification scheme, can be helpful but their use is not required.

### 4-2. Institutional Analysis.

#### a. Overview.

(1) The institutional analysis is conducted during the EE/CA process. The institutional analysis process provides the opportunity to collect basic data to support an institutional control program. The objectives of the institutional analysis are to illustrate the opportunities that exist to implement an institutional control program at a specific site; identify government agencies having jurisdiction over OE contaminated lands; and assess the appropriateness, capability and willingness of government agencies to assert their control over OE contaminated lands.

(2) An institutional control program may consist of a single institutional control or a combination of strategies. The local community and stakeholders drive the development of the appropriate institutional control alternatives. The alternatives for the site should reflect the framework of the local institutions and the needs of the community. Therefore, the product of the institutional controls analysis should be the selection of the institutional control that is supported by the community and reflects the site-specific objects identified at the beginning of the project.

#### b. Assessment of Institutions.

(1) Local and state government agencies and other organizations can assist in the development, implementation and/or maintenance of the institutional control program. There are five elements to consider when assessing the ability of a local, state, Federal, or private agency to assist in the implementation or monitoring of a proposed institutional control program. The five elements are listed in Table 4.1 and discussed in the following paragraphs.

Table 4.1 Five Elements of an Institutional Analysis
<ul style="list-style-type: none"><li>• Jurisdiction of the Agency</li><li>• Authority Exercised by the Agency within its Jurisdiction</li><li>• Mission of the Agency</li><li>• Capability of the Agency</li><li>• Desire of the Agency to Participate in the Institutional Control Program</li></ul>

(a) Jurisdiction of the Agency. Federal, state, and/or local government agencies may have jurisdiction within the area of a project site. The laws governing the existence of the specific agency will convey this jurisdiction. Tribal governments and commissions may also have jurisdiction within certain areas. Determining which agency within the various levels of government has the appropriate jurisdiction for a specific site may prove challenging. In some areas, several agencies may be involved, depending on the type of institutional control or what specific aspect of an institutional control is being contemplated. Private agencies do not usually have any jurisdictional authority.

(b) Authority Exercised by a Government Agency within its Jurisdiction. Key questions that must be asked regarding the authority exercised by a government agency are listed below. Private agencies usually do not have any enforcement authority other than those provided by normal trespass laws.

- What are the limits of the agency's authority?
- What is the origin of the agency's authority?
- How much control is exercised by the agency?
- Does the agency have enforcement authority?

(c) Mission of the Agency. The specific mission of the agency is critical to its ability to implement, enforce, or maintain an institutional control program. Two critical missions for the USACE in OE response are public safety and land use control. If USACE can find a similar mission at another government or private agency, there is reasonable potential that a cooperative institutional control program can be implemented.

(d) Capability of the Agency. Even if an agency has the jurisdiction, authority, and mission to be involved in an institutional control program, if it does not have the capability, it cannot be an effective partner. In the case of local government agencies, the capabilities may be unique and are often a reflection of the desires of the local community. The capabilities of a government or private agency can be augmented, however, with additional funding in order to implement the additional requirements of the proposed institutional control program.

(e) Desire of the Agency to Participate in the Institutional Control Program. The desire of a particular government or private agency to participate in an institutional control program is absolutely critical to its success. The Federal Government must encourage the participation of a local agency in the implementation of an institutional control program. If local officials are convinced that participation in an institutional control program is in their best interests, USACE will have little difficulty in persuading them that they should participate. Resources in the form of funding for the agency's implementation costs may overcome the initial hesitancy to become involved.

(2) The basic data necessary to determine the jurisdiction, authority, mission, capabilities and desire of government or private agencies to assist in the implementation or maintenance of an institutional control program may be collected through a series of interviews with key personnel within the identified agencies. The interviews should be conducted through personal contacts. The data can be collected and collated to ensure complete coverage of all of the potential agencies. Appendix F includes a sample institutional analysis summary format. This information can then be summarized to determine which agencies can best assist in the institutional control program and to develop basic plans of action. Sensitivity to local concerns and some creativity will be required in developing a complete institutional control program for a site.

c. Determination of Any Land Restrictions. While performing the institutional analysis, it is necessary to determine the existence of any current deed restrictions or other type of institutional control that may have been placed on the property in the past as a result of some other activity. If such restrictions are found to already exist at a site, it may be easier to modify the existing restriction to address the OE risk than to implement an entirely new institutional control. A complete and thorough records search of the property must be performed in order to determine if any current restrictions exist. Local title search firms may be used to perform this function, as they are often the most knowledgeable about the best repositories of local property records.

d. Institutional Analysis Report. Upon completion of the data collection, the results of the study must be documented in an Institutional Analysis Report. The report may either be prepared as a stand-alone document or as an appendix to the overall site characterization report (e.g., EE/CA Report). The Institutional Analysis Report should include the following sections:

- (1) Purpose of the Study;
- (2) Methodology;
- (3) Scope of Effort;
- (4) Selection Criteria (Jurisdiction, Authority, Mission);
- (5) Acceptance of Joint Responsibility (desire to participate in the institutional control program);
- (6) Technical Capability;
- (7) Intergovernmental Relationships;
- (8) Stability;
- (9) Funding Sources; and
- (10) Recommendations.

#### 4-3. Other Tools to Aid in the Development of an Institutional Control Program.

a. Land Use Matrix. The Future Land Use Working Group has developed a land use matrix tool to aid in identifying and resolving complex issues related to restoration and reuse of contaminated sites. This tool has been developed to aid in building consensus among various stakeholders regarding the need for and level of institutional controls at a contaminated site. While the land use matrix was developed specifically for BRAC sites, it can also be used at any site where institutional controls are being proposed. By laying out the potential alternatives in matrix form, all parties can see the cost, benefit, and potential results of combinations of various remedial and institutional control alternatives. Table 4.2 lists the six elements of the basic matrix, which may be adapted to address site-specific conditions.

b. Land Use Classification Schemes. Another tool that is available to help define the level and extent of institutional controls is a land use classification scheme. A land use classification scheme identifies areas that are contaminated with OE and places use restrictions on those areas in accordance with the level of OE contamination. In addition to being a tool in the development of an institutional control plan, once a land use classification scheme has been developed it may also become a part of the program.

<p style="text-align: center;"><b>Table 4.2</b> Basic Elements of the Land Use Matrix</p>	
Element 1: Remedy Alternatives	All potential methods for cleanup being considered at a site are referred to as remedy alternatives. All alternatives included in the matrix should meet both engineering and legal requirements.
Element 2: Cost	The cost of each remedy alternative should be estimated. The cost should include all aspects of the alternative, including construction, short and long-term monitoring, and operation and maintenance.
Element 3: Time until available for reuse.	The time available for reuse accounts for the time it will take to prepare the property for reuse, including the time required for preparation to lease or transfer by deed.
Element 4: Restrictions on Use	Any restrictions on use of the property after meeting the remedial action objectives should be listed and a description of the proposed institutional controls included.
Element 5: Alternatives for Reuse	Reuse alternatives may be general or specific. General categories include residential, educational, commercial, office, industrial, recreational, aviation, or open space. More specific reuse alternatives may be necessary depending on the nature of the risk posed by OE at the site.
Element 6: Potential for reuse at completion of the remedy	<p>The matrix uses three codes to differentiate among the potential for reuse. These codes include:</p> <ul style="list-style-type: none"> <li>★ Indicates that the site or a portion of the site is not feasible for a particular reuse because of the identified remedy.</li> <li>⊖ Indicates that there are some restrictions on a particular reuse of the site or a portion of the site for the identified remedy.</li> <li>☑ Indicates that there are no restrictions on a particular reuse of the site or portion of the site for the identified remedy.</li> </ul>

## CHAPTER 5 PRINCIPLES OF AN INSTITUTIONAL CONTROL PROGRAM

### 5-1. Introduction.

a. This chapter discusses the principles to consider when developing an institutional control program. These items are described as principles because they apply uniformly to the development of all institutional control programs. These principles are featured in Table 5.1 and discussed in the following paragraphs.

<div>Table 5.1</div> <div>Principles for Developing an Institutional Control Program</div>
<ul style="list-style-type: none"><li>• An institutional control program is always appropriate on any site contaminated with OE.</li><li>• All parties with interest in the property must be involved in the process.</li><li>• Notice in various forms is useful in protecting communities from the harmful effects of misuse of OE contaminated lands.</li><li>• Every institutional control program must have an assurance strategy that is developed along with the basic plan.</li><li>• Multiple levels of control and layers are desirable for any institutional control program.</li><li>• Records are necessary to evaluate the continued effectiveness of the institutional control program during recurring review.</li><li>• The federal government should pay for separable costs of Institutional Controls if they are an expansion of normal responsibilities of local agencies.</li></ul>

5-2. An Institutional Control Program Is Always Appropriate On Any Site Contaminated With OE. When physical OE removal is conducted, the use of best technology, professional oversight and the epitome of quality assurance does not provide for the detection of all ordnance on the site. Therefore, the application of institutional controls is an appropriate mechanism to keep the public safe from OE hazards. The success of the institutional control program is based on the attitudes of the local institutions and community. Trust, commitment and responsibility must be communicated and accepted by all stakeholders and the Federal Government.

5-3. All Parties With Interest In The Property Must Be Involved In The Process. The foundation of an institutional control program is meaningful stakeholder involvement. Active involvement of the local officials and community is paramount to the development of local initiatives that will be supported and successfully implemented.

5-4. Notice In Various Forms Is Useful In Protecting Communities. The local institutions should make the decision regarding the type and extent of public notification. While notice is always beneficial for safety consideration, global community notice may alarm the public and have detrimental impacts. For example, property values may be adversely affected. Therefore, it is important for local officials to target only those groups impacted by OE decisions. For example, notice may be provided during the issuance of building permits to inform those individuals most likely to be effected (i.e., those engaged in excavation activities).

5-5. Every Institutional Control Program Must Have An Assurance Strategy. Because of safety issues inherent on an OE site, an assurance strategy is an important consideration during institutional controls planning. Forms of assurance include recognition of responsibilities at all levels of government and private citizens, state oversight, frequent communication, recurring review, elements of the maintenance requirements and a fastidious attitude toward keeping commitments at the Federal level. Only community action in the largest sense can determine adequate assurance.

5-6. Multiple Levels Of Control And Layers Are Desirable For Any Institutional Control Program. Designing layering or redundancy into an institutional control program will maximize the strengths of the individual controls while minimizing their limitations. Multiple levels of institutional controls help target different "at risk populations" and add to the stability of the system. For example, children that go to school near ordnance contaminated lands should be approached differently than construction workers who excavate for utilities. School programs and informing parents are essential in the former group and it may be more effective to issue a construction permit subject to elements of a safety plan based on the site-specific ordnance contamination to the construction company. Violation of the excavation safety plan developed during the removal project may result in voiding the construction permit. Delays, fines and penalties may provide sufficient incentive for compliance under those conditions. In general, we should avoid redundant regulations. Oversight, quality assurance and recurring review may add safety benefits.

5-7. Records Are Necessary To Evaluate The Continuing Effectiveness Of The Institutional Control Program During Recurring Review. Records must be maintained so the recurring review may assess the continuing commitment at all levels within the community. Any opportunity for enforcement must include records of implementation of the controls agreed upon during the project planning.

5-8. The Federal Government Should Pay Separable Costs Of Institutional Controls If They Are An Expansion Of Normal Responsibilities Of Local Agencies. Much of the proposed efforts under institutional controls is mandated by state and local law. If services required in the institutional control program are provided for under state or local funding, then the Federal Government is usually not obligated to fund these services.



## CHAPTER 6 THE ESTABLISHMENT, IMPLEMENTATION AND TERMINATION OF INSTITUTIONAL CONTROLS

6-1. Introduction. This chapter discusses the requirements for establishing, implementing and terminating an institutional control program at an OE site.

6-2. Establishing Institutional Controls.

a. The following issues should be considered when establishing an institutional control program: preparation of an institutional control plan; preparation of support agreements; establishment of funding for the implementation and maintenance of the institutional control program; and provision of an appropriate level of public notice regarding the establishment of the institutional control program.

b. Preparing an Institutional Control Plan.

(1) An institutional control plan should be prepared when an institutional control program is being formulated for a site. The institutional control plan is normally prepared during the EE/CA process. The plan should be a brief summary of the major issues and objectives that the institutional controls have been designed to address. Issues covered in the plan should include:

(a) General description of site boundaries;

(b) Specific institutional controls that will be used on the site;

(c) How the proposed institutional controls will reduce the risk of OE exposure;

(d) What local, state, Federal Government, or private agencies, or individuals are involved in the implementation, administration, enforcement, and/or maintenance of the institutional controls;

(e) Identification of short-term and long-term costs and funding sources;

(f) Schedule for implementation and inspection of the institutional controls;

(g) How long the institutional controls will have to remain in place; and

(h) Procedures for modification or termination of the institutional controls.

(2) The institutional control plan should be reviewed by all parties that will be involved in implementing or maintaining the institutional controls. It is important that all parties with approval

authority be included in the review process. In addition, local community groups and outside state agencies that may not be directly involved in the institutional control program, but may have an interest in the program, should also be copied on the final plan.

c. Preparing Support Agreements.

(1) Detailed support agreements are an essential part of an effective institutional control program. Upon completion of the institutional control plan, specific support agreements should be prepared between USACE and the respective supporting agencies that will be involved in the implementation or maintenance of the institutional controls. The support agreement must detail the specific responsibilities for items including administration, inspection, maintenance, funding, and enforcement that will be required from each supporting agency. The appropriate vehicle and the specific format and requirements for the preparation of a support agreement will depend on site specific characteristics and the nature of the agency that is providing the assistance.

(2) If DOD is to retain title to a piece of OE-contaminated property as part of an active military installation (e.g., Aberdeen Proving Ground), the institutional control program may also be recorded in the Base Master Plan (BMP). The BMP establishes land uses similar to a municipal zoning plan and is utilized in the evaluation of land use decisions and for project planning. Prior to using the BMP as a means to establish an institutional control program at a base, it should be confirmed that the specific installation BMP can be used for this purpose and that the BMP system is adequate to ensure adherence to the proposed institutional control program.

(3) A Memorandum of Agreement (MOA) or Memorandum of Understanding (MOU) between the DOD installation, USACE, and the appropriate regulatory agencies may also be used to record the details of an institutional control program.

(4) An institutional control program shall be recorded as a response action in a Remedial Action Plan (RAP) or Record of Decision (ROD). For example, at Aberdeen Proving Ground, Maryland, the institutional control plan was included in the ROD for the site; thereby, making the institutional control legally enforceable. In addition, by recording the institutional control in the ROD, the Army becomes legally responsible for complying with, funding, and implementing the plan.

(5) Regardless of which instrument is used to implement an institutional control program, the institutional control plan should include a description of each institutional control, the purpose for the control, specific conduct and activities that are prohibited, requirements for implementation of the control, and procedures to take if the land use plans change. References to applicable site characterization documents (e.g., Remedial Investigation/Feasibility Study, EE/CA, ROD, Action Memorandum, etc.) should also be included. The institutional control plan should include a land survey

of the site boundaries, and in the case of sites at active installations, the boundaries should be added to appropriate base maps.

d. Funding the Implementation and Maintenance of the Institutional Control Program. As with any remedial alternative, funding is a key issue in the implementation of an institutional control program. USACE must commit to programming funding for both the implementation year and the out-years to ensure that funds are available to implement and maintain the proposed institutional control program.

(1) Determination of Funding Requirements. In evaluating the implementation of an institutional control program at a site, the funding requirements for all aspects of the program must be considered upfront. The relative costs of different combinations of institutional controls and their applicability to site-specific conditions should be evaluated. The land use matrix and other tools introduced in Chapter 5 for use in the assessment and comparison of remedial alternatives may be helpful.

(2) Alternative Solutions for Fund Site Management. Appendix D contains a listing of programs that might be used as part of an institutional control program at an OE-contaminated site. Additional sources of funding may be available through these programs, as was the case when the Sikes Act was used at Aberdeen Proving Ground in Maryland.

e. Providing Public Notice of the Proposed Institutional Control Program.

(1) The USACE Real Estate Handbook (ER 405-1-12) requires that when land contaminated with OE or toxic agents is released or transferred, the general public must be notified regarding the possible presence of and inherent danger of handling such contaminants. This notice may take various forms such as newspaper articles or advertisements, television or radio announcements, or posting notice at the site. The notice should include not only the risks posed by the site, but also instructions on how to report the discovery of an OE object or any injuries suffered as a result of an explosion or exposure to toxic agents. The notice should also include the name and telephone number of the responsible agency and a warning that any incidents should be reported immediately. Local government agencies, such as local law enforcement, whose cooperation should be secured in the development of the institutional control program, can provide assistance in the timely reporting of such a discovery or accident.

(2) In addition to the general public notice described above, an effort should also be made to notify and inform local scrap dealers about the potential presence and the dangers of OE objects. This is due to the fact that many OE accidents are the result of explosive objects being removed from a property and sold to the local scrap dealer. Scrap dealers should be asked to refuse to buy military scrap from private parties unless it has been processed in accordance with OE MCX policy in order to avoid such accidents.

6-3. Implementing an Institutional Control Program.

a. Legal Framework and Regulatory Programs.

(1) Federal, state, and local governments play a key role in the implementation of institutional control programs at OE-contaminated sites. These agencies may use existing programs that they already administer to implement an institutional control program. By using such programs, the Federal, state, and/or local agency can show the legal authority and jurisdiction necessary to implement the proposed institutional control.

(2) In general, Federal and state regulatory agencies have direct legal authority to protect human health and the environment, prevent releases of contaminants, and control activities at contaminated sites through the statutory authority provided under CERCLA and RCRA. In a similar manner, state and local government agencies typically have authority and jurisdiction in the implementation of land use zoning and land use plans, the issuance of building permits, the enforcement of public health programs, and the enforcement of statewide environmental programs.

b. Deed Language for Proprietary Controls and Other Commitments.

(1) Ensuring that the correct deed language is used to implement a legal mechanism, such as a deed restriction, is critical to the success of the restriction. The specific language necessary to make the restriction enforceable within the jurisdiction often varies depending on the state in which the site is located. An example of deed language to establish a reversionary interest is included in Appendix G. This example is provided for illustrative purposes only and should not be used without appropriate legal review. The appropriate legal language will vary depending on site specific conditions and state and local law.

(2) The American Society of Testing and Materials Risk Based Cleanup and Assessment Guidelines outline four general conditions that must be met to make a deed restriction binding and enforceable. They include:

(a) The restriction must be in writing.

(b) The duration of the restriction must be specified. For the restriction to be held in perpetuity the phrase “runs with the land” is commonly used.

(c) For enforcement purposes, parties must have privity of estate (i.e., a real relationship to the land). Therefore, the state or other government entity must be the buyer or seller in order to enforce the

deed restriction. An entity that is not privy to the land may have the power to enforce a deed restriction if, at the time of the purchase, the buyer was made aware of this and it is written in the deed.

(d) The restriction must “touch and concern the land”. This means that the land or the use of the land must be the focus of the restriction. Generally, these types of restrictions devalue the owners legal interest in the land in some way. Promises that are personal in nature and only concern human activities on the land are least likely to be enforceable.

(3) More specifically, land transfer documents for sites that may contain OE should address the following issues:

(a) A stipulation of the permissible end uses consistent with the clearance depth and a statement that any future use that is inconsistent with these use restrictions will present explosive hazards. If the clearance depth was less than the DDESB default for commercial/residential/ utility construction activity (see Table 3.2), the land transfer documents must include a requirement to notify USACE before any commercial/residential/utility construction activity. Transfer documents should also require that no excavation be accomplished until USACE has either granted permission to excavate or has come to the site to perform nonintrusive geophysical surveys and/or remediate the property prior to or in conjunction with excavation.

(b) If an OE clearance depth was determined using site specific information or penetration data, the deed should prohibit soil disturbance below the OE clearance depth.

(c) If the clearance depth was based on DDESB defaults, the future land use will be restricted to that depth commensurate with the chosen default depth (see paragraph 3-5).

(d) The transfer documents will detail the amount and type of known or suspected OE, describe the OE response actions taken during the investigatory and remedial stages of the project, and, if applicable, provide an estimate of the type and amount of OE remaining on the site.

(e) If OE is believed to be located above the frost line, but below the removal depth, the land transfer documents will provide the USACE the right of access to the property in order to conduct periodic surveys. The length of time that this right of access will be necessary will be determined by USACE based on site specific information.

c. Records and Community Involvement.

(1) Army policy requires that properties slated to become inactive or closed are to have all records relating to OE contamination of the property maintained in perpetuity. When accountability and control of Army real property that contains OE is transferred to another DOD component or Federal agency, that action will be accompanied by a transfer of all records relating to the OE contamination of the property. These records will be permanently maintained by the receiving agency.

(2) The information listed in Paragraph 6-3(b)(3) above must be included with the AR 405-90, Disposal of Real Estate, report of excess to ensure entry in the permanent land records of the civil jurisdiction in which the property is located.

(3) In addition, when an OE-contaminated property is transferred between government agencies, a MOA will be negotiated between the USACE and the receiving Federal agency. The MOA will define the area of concern, identify any specific land use restrictions of the property, and outline any legal or engineering controls that have been established on the property.

(4) The release of OE-contaminated properties currently owned by DOD to owners outside of DOD is generally unacceptable. If, however, such a transfer is considered, an explosives safety submission must be prepared and submitted to the Department of Defense Explosives Safety Board (DDESB). The explosives safety submission will refer to sufficient supporting documentation (e.g., administrative record, risk assessment, site investigations, and other site-specific documentation) in order for the DDESB to make an informed decision on the viability of the proposed institutional controls for a subject site.

(5) The importance of providing public notice of an institutional control program and including the community in the development of the plan has been stressed throughout this report. An organized community involvement program that is used throughout the development and implementation of institutional controls will keep local government representatives and the citizenry informed. By keeping these groups informed, feedback may be obtained which may be helpful in developing an effective institutional control program. Such feedback also serves to foster goodwill between DOD and the community. A complete record must be maintained of all community involvement activities performed during the development and implementation of an institutional control program. These records will be maintained along with the other OE site investigation and remediation records prepared for the property.

d. Appendix H contains a checklist addressing issues related to implementing institutional controls.

6-4. Maintenance of an Institutional Control Program. This section provides a general discussion of some generic operations and maintenance considerations for an institutional control program.

a. Maintaining the Effectiveness of Institutional Controls.

(1) Setting up evaluation criteria. The institutional control plan should include the development of site specific criteria that will be used to ascertain whether the program is achieving the specified goals. The criteria may include:

(a) Is the current land use appropriate or in compliance with the institutional control program?

(b) Are engineering controls performing as intended? For example, if fences are used as a barrier to access, an evaluation may include review of trespassing occurrences and how they were handled, as well as evaluation of the physical condition of the fence (e.g., are there any holes or gaps in the fencing). If signs are used, an evaluation should include a review of whether the signs are generally heeded or ignored, and whether the signs are easy to understand and visible.

(c) Is the public notice and education component of the institutional control program reaching those at risk? This may be evaluated by reviewing attendance at public education meetings, gauging public response to the controls, conducting random interviews throughout the community, etc.

(2) Developing procedures to coordinate the activities of the responsible parties. The institutional control plan should address the responsibilities of the various parties involved for maintaining the effectiveness of the institutional control plan. These procedures should include the frequency and types of inspections; reporting requirements for any inspections made; reporting of any noted violations; and, enforcement responsibilities.

b. Resources. The resources available for maintenance activities should be considered when comparing different institutional controls that may be implemented at a site. Resources may be available at the Federal, state, and/or local level. The available resources will vary from site to site. For example, one locality may have a strong, well developed and administered local planning agency or building permitting agency, making zoning and permitting restrictions more attractive and feasible as institutional controls in that location. On the other hand, some areas may have very little in the way of local government resources that can be drawn upon to help maintain an institutional control program. The level of interest and cooperation from any potential agencies must be considered before obligating these agencies to assist in the maintenance of institutional controls.

c. Enforcement Authorities. The enforcement authority will depend on the type(s) of institutional control implemented at a site as well as the legal authority held by the prospective enforcement agency.

(1) Zoning. Depending on the site location, the state and/or the local government may have the authority to develop, modify, and enforce existing zoning ordinances. However, zoning ordinances have mixed legal authority, depending on the jurisdiction, and are often modified over time. This should be considered, therefore, before using zoning ordinances as an institutional control.

(2) Property Laws. The effectiveness of property laws as part of an institutional control program also varies greatly between states. Depending on the location and on the type of agreements pertaining to a site, Federal, state and local governments, as well as private citizens, may have the right to enforce or seek enforcement of an institutional control through common property laws. For example, in the case of restrictive covenants and easements, the parties to the agreement have the right to seek enforcement if one party violates the conditions of the agreement. The parties to these agreements may include Federal, state and local government agencies, private organizations, or private citizens.

(3) Permitting. Establishing an institutional control through a permitting program can be an effective component of an overall institutional control program. Enforcement of permitting programs lies with the administering agency. For example, building permits are generally administered by the local government and agencies of the local government that have been established to administer and enforce such programs.

(4) Other Laws or Ordinances. Depending on the site, other agencies may have enforcement authority. For example, the United States Fish and Wildlife Service has authority at Aberdeen Proving Ground, Maryland where OE-contaminated areas were designated as Natural Resource Management Areas as part of an institutional control program.

d. Coordination of Long-Term Responsibilities. The support agreement developed for the site should include a discussion and assignment of long-term administration, maintenance, funding, and enforcement authority.

e. Funding. The operation and maintenance activities necessary as part of an institutional control program will require on-going funding. The amount of funding required will vary on a site-by-site basis and will depend on many factors including the type(s) of institutional control selected, the location of the site, and the associated level of cooperation and support from local agencies. Negotiations with the local administering agency will be necessary to determine the exact level of funding. The specific funding to be given to an agency should be included in the institutional control plan. USACE districts will be responsible for planning and programming the necessary funding for the operation and maintenance of the institutional control program.

f. Monitoring/Inspection Requirements.



(1) In order for an institutional control to be effective in protecting the public from residual contamination at a site, periodic monitoring and inspection activities must be a part of the institutional control program. The institutional control plan should address the need to maintain access to a property for monitoring and inspection requirements. This may be accomplished through the use of an easement. Appendix G contains sample language for such an easement. Access to a site could also be accomplished under a right-of-entry agreement, however such an agreement is binding only on the current landowner and may be voided if the property is sold. In contrast, a properly executed easement will run with the land, ensuring access to the property for the extent of long-term monitoring required by institutional controls.

(2) Type of Inspections. Legal mechanisms such as deed restrictions, permitting programs, zoning ordinances, and siting restrictions will require periodic site visits to ensure that the controls are being obeyed. The exact content of these site visits will vary depending on site specific characteristics and restrictions, but may entail visual observation of land use and interviews with property owners, neighbors, and users. Such interviews should ascertain whether the current use(s) are appropriate for the site's conditions relative to the residual contamination and whether the land use is in compliance with the institutional control program. Engineering controls such as signs, fences, and soil caps will require similar site visits which, in addition to an assessment of land use and site activities, will also include inspection of the integrity of the physical control.

(3) Areas to be Inspected. Any areas containing residual contamination which is being controlled by an institutional control should be included in a site inspection. It may also be appropriate to observe surrounding land use during the inspection to evaluate whether the assumptions made at the time the institutional control plan was developed are valid and whether the chosen control is still protective of human health.

(4) Frequency of Inspections. When contamination is left in place and an institutional control program has been used to limit the risk, the Federal Government is required to review the remedy at least every five years. More frequent inspections may be necessary in the case of land use controls, for example, when the site is located in an area of rapid or continual development. More frequent inspections may also be required by certain statutes that may have been used as part of an institutional control program. For example, the Sikes Act which was used at Aberdeen Proving Ground, Maryland to designate two OE-contaminated sites for use as Natural Resource Management Areas, requires regular review (not less often than every five years) of the operation and effectiveness of the plan in terms of natural resource management and yearly reports on related activities. USACE districts are responsible for coordinating these inspections and reviews.

h. Appendix I contains a checklist addressing operations and maintenance issues for institutional controls.

6-5. Procedures for Modification or Termination of an Institutional Control Program.

a. Introduction. Over time, it may become necessary to modify or terminate an institutional control program. The institutional control plan should address the procedures for performing periodic reviews of the institutional control to determine the effectiveness of the institutional control program, and for making any changes that are deemed necessary.

b. Conditions for Modification of the Institutional Control.

(1) An institutional control may require modification due to changes in land use or improvements in OE detection or removal technology. Advances in detection, removal, and destruction technologies may make additional site cleanup economical and safe at some point in the future. Current technologies are limited in the extent of removal that can be achieved at a reasonable cost. Many times, the cost of ordnance removal actions exceeds the value of the real estate. With the current state of ordnance removal technologies, removal actions do not guarantee complete clearance of a site. There are currently several programs underway to identify technological improvements in OE detection and removal technologies. An example of one such program is the UXO Advanced Technology Demonstration Program established by the U.S. Army Environmental Center to evaluate and identify innovative, cost-effective, commercially available systems for the detection, identification, and removal of UXO that may improve the efficiency of removal actions in the future.

(2) Advances in OE detection and removal technology may make it possible to further characterize the distribution of OE and/or remove these items, thereby decreasing the risk of OE exposure at a site and perhaps decreasing the need for the current level of restrictions. The need for and the effectiveness of the institutional control program should then be reviewed based on the new site condition or technology.

(3) An institutional control plan may also require modification due to changes in local land use to ensure that the controls that are in place are still protective of human health and the environment.

c. Conditions for Termination of the Institutional Control. The risk from OE is long-term and OE items are expected to remain hazardous for an indefinite period of time. Although munitions components may deteriorate through weathering and corrosion to a point that the munition will not function as intended, there is no easy way to know how long this process may take, and deterioration does not necessarily mean that the munition is not hazardous. The nature of OE seems to preclude the possibility that institutional controls implemented to prevent exposure to these items can be completely eliminated, unless advances in OE detection and clearance technology make detection and removal of these items more economical, complete, and safe.

d. Legal Requirements. If an institutional control requires modification or termination, legal counsel should be consulted to determine the specific steps required (e.g., the legal steps required to remove a deed restriction).

e. Coordination among authorities, land owners, and other organizations. In considering modification or termination of an institutional control, all parties involved in the development, implementation, maintenance, etc. of the institutional control program should be consulted.

f. Funding. A source of funding should be identified in the institutional control plan to support evaluation of modification or termination. The responsibility for funding additional cleanup should also be addressed in the institutional control plan.

g. Advances in Technology. As discussed above, advances in OE detection, removal, or destruction technologies may make cleanup of OE-contaminated sites more economical, efficient, and safe. The institutional control plan should address responsibility for determining when additional cleanup activities would be conducted and who would be responsible for funding and conducting such activities.

h. Appendix J contains a checklist addressing issues related to modification and termination of institutional controls.